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Green Manuring - An Organic Approach towards Farming

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Green manuring a practice of ancient origin- is defined as the use of undecomposed green plant material, grown in situ or cut and brought in for incorporation to improve soil productivity. The species commonly used for green manuring are of the Leguminosae with Crotalaria juncea (sunnhemp) and Sesbania aculeate (Dhaincha) being the most popular in India, and Vicia spp., Trifolium spp. and Astragalus sinicus in cooler climates. Green manuring should not be confused with cover-cropping, in which a crop, generally a legume of longer duration, is sown primarily to protect the soil from erosion, conserve moisture and suppress weeds, while at the same time improving soil-N status and fertility in general. A leguminous crop producing 8 to 25 tonnes of green matter per hectare will add about 60 to 90 kg of N when ploughed under. This amount would equal an application of three to ten tonnes of FYM on the basis of organic matter and its N contribution. The green manure crops also exercise a protective action against erosion and leaching of the various nutrients into the deep soil layers. Green-manuring is, thus, a very useful soil-improving practice for building up soil fertility.

How to Plant and Grow Green Manure Crops:

Proper planting time depends on the type of cover crop you are growing. If you are rotating in legumes for an entire growing season in your garden or farm, they are generally planted in the spring, whenever soil temperatures are suitable for the species. Generally, this means that seeds can be planted when all danger of frost has passed and the ground can be worked. In warmer regions without freezing winters, legumes also can be planted in the fall and grown through the winter. Remember that if you are growing legumes for green manure, they need a full season in order to properly fix nitrogen. After peas or beans are harvested, rather than pulling the plants from the ground, just chop them up and dig them into the soil with a shovel or tiller-leaves, stems, roots, and all. For non-legume grasses being grown as green manure, the cover crops can be planted in the spring. They grow quickly and can be dug into the soil in early summer before you plant warm-season vegetables or, depending on your climate, you may be able to plant a grass such as winter rye in the late summer after the garden harvest; it will grow to maturity in the fall and can be dug into the garden in spring before you plant the early cool season vegetables. In some climates, it may even be able to grow two rounds of cover crops framed around the other garden crops-planting the first green manure crop in the early spring, then another in the late summer or early fall. The best time to plant cover crop seeds is right before an expected rainfall. The seed must not dry out during the germination period. Mixing the seeds with sand or soil before spreading helps you have more control over where it goes. After the spread of seeds, rake the soil to cover them sufficiently for germination. Water lightly if rain is not predicted (Eos.com, 2021).

Green Manuring

1. The practice of ploughing or turning into the soil undecomposed green plant tissue for the purpose of improving physical condition as well as fertility of soil is referred to as green manuring and the manures obtained by this method is known as green manures.
2. The use of green manure in crop production is recorded in China as early as 1134 BC.

Green Manuring In-Situ

1. Any crop or palnt (generally leguminous) grown and ploughed in situ is called green manuring in situ.
2. E.g.: Sesbania (Sesbania speciosa), Dhaindia (Sesbania aculeate), Sunhemp (Crotolaria juncea), Phillipesara (Phaseolus trilobus), Cowpea (Vigna anguiculata), Green gram/Mungbean (Vigna radiata), Black gram (Vigna mungo), Berseem (Trifolium alexandrium) etc.

Green Leaf Manuring

1. Consists of gathering green biomass (tender leaves and twigs) from nearby location (bunds, field boundaries) and adding it to the soil.
2. E.g.: Cassia auriculata, Neem (Azadiracta indica), Glyricidia (Glyricidia maculate), Leucaena leucocephala, Cassia tora, Tephrosia purpurea, Vitex nigundo, Karanj (Pongamia glabra), Calotropis (Calotropis gigantea), Dhaincha, Sunhemp, Glyricidia, Cassia, Green gram, Cowpea, Soybeam Pongamia glabra, Subabul etc.

Advantages of Green Manuring

- Green manure crops absorb nutrients from the lower layer of soils and leave them in the soil surface layer when ploughed in for use by the succeeding crops.
- Helps in improving physical and chemical properties of soil. E.g., Builds up soil structure, improves tilth, formation of crumbs in heavy soil, increases water holding capacity.
- Helps to maintain OM status of soil.
- Acts as source of food and energy to soil microbes and increases their population.
- Prevents leaching of nutrients to lower layers.
- Helps in release of nutrients in available form for use by the crops. E.g., GM crop increases the solubility of lime phosphate because of increase in microbial activity.
- Increases aeration of rice soils by stimulating the activities of surface films of algae and bacteria.
- It reduces soil temperature and protects the soil from the erosion action of water as it forms canopy cover on the soil.
- Increases yield to the extent of 15-20 per cent compared to no green manuring.
- Leguminous green manure plants helps in N-fixation and adds the same to the soil. E.g., 60-100 kg N/ha in single season.

Characteristics of Green Manure Crop

- High N accumulation rates.
- Timely release of nutrients.
- Photoperiod insensitivity.
- Short duration, fast growing, high nutrient accumulation ability.
- Multipurpose use.
- Tolerance to shade, flood, drought and adverse temperatures.
- Wide ecological adaptability.
- Efficiency in use of water.
- Early onset of biological N-fixation.
- Ability to cross inoculate or responsive to inoculation.
- Pest and disease resistance

- High seed production, high seed viability.
- Ease in incorporation.

Disadvantages of the Green Manuring

- ❖ Under rainfed conditions, it is feared that proper decomposition of the green manure crop and satisfactory germination of the succeeding crop may not take place if sufficient rainfall is not received after burying the green manure crop. This particularly applies to the wheat regions of the India.
- ❖ Since green manuring for rabi season (wheat) means the loss for the kharif crop, the practice of green manuring may not be always economical. This applies to the regions where irrigation facilities are available for raising kharif crop along with easy availability of fertilizers.
- ❖ In case the main advantage of the green manuring is to be derived from addition of N, however sometimes the cost of growing green manure crops may be more than the cost of commercial nitrogen fertilizers.
- ❖ An increase of diseases, insects and nematodes is possible.
- ❖ A risk is involved in obtaining a satisfactory stand and growth of the green manure crops, if sufficient rainfall is not available.

Conclusion

We can be only as healthy as our soils are. Once our soils lose their fertility, we lose our ability to cultivate crops and plants we need to sustain our good health. Maintenance of healthy soils has been a critical aspect of our life for thousands of years. With increasing challenges in agriculture, in terms of climate change, extreme weather events, soil degradation and land contamination by the overuse of agricultural chemicals, there is immense and immediate action arose in which implementation of green manuring also known as “fertility building” into their farm practice. Growing green manure proves to be a practical and economical method of securing long-term productivity of farmed lands.

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